





















FIGURE 10A

FIGURE 10A

| Protein  | Organism                      | EC#      | GenBank / GenPept   | SwissProt        | PDB / 3D |
|--|-------------------------------|----------|---|------------------|----------|
| At1g08660/F22O13.14  | <i>Arabidopsis thaliana</i>   | n.d.     | AC003981 AAF99778.1<br>AY064135 AAL36042.1<br>AY124807 AAM70516.1<br>NC_003070 NP_172342.1<br>NM_180609 NP_850940.1 | Q8VZJ0<br>Q9FRR9 |          |
| $\alpha$ -2,3-sialyltransferase (ST3Gal-IV)                                    | <i>Bos taurus</i>             | n.d.     | AJ584673 CAE48298.1   |                  |          |
| $\alpha$ -2,6-sialyltransferase (Siat7b)                                       | <i>Bos taurus</i>             | n.d.     | AJ620651 CAF05850.1   |                  |          |
| $\alpha$ -2,8-sialyltransferase (Siat8D)                                       | <i>Bos taurus</i>             | n.d.     | AJ699421 CAG27883.1   |                  |          |
| CMP $\alpha$ -2,6-sialyltransferase (ST6Gal I)                                 | <i>Bos taurus</i>             | 2.4.99.1 | Y15111 CAA75385.1<br>NM_177517 NP_803483.1  | O18974           |          |
| sialyltransferase ST3Gal-II (Siat4B)   | <i>Bos taurus</i>             | n.d.     | AJ748841 CAG44450.1   |                  |          |
| sialyltransferase ST3Gal-VI (Siat10)   | <i>Bos taurus</i>             | n.d.     | AJ748843 CAG44452.1   |                  |          |
| ST6GalNAc-VI   | <i>Bos taurus</i>             | n.d.     | AJ620949 CAF06586.1   |                  |          |
| polysialyltransferase (PST) (fragment) ST8Sia IV                               | <i>Cercopithecus aethiops</i> | 2.4.99.- | AF210729 AAF17105.1   | Q9TT09           |          |
| $\alpha$ -2,3-sialyltransferase ST3Gal I (Siat4)                               | <i>Clona intestinalis</i>     | n.d.     | AJ626815 CAF25173.1   |                  |          |
| $\alpha$ -2,8-polysialyltransferase ST8Sia IV                                  | <i>Cricetulus griseus</i>     | 2.4.99.- | -AAE28634<br>Z46801 CAA86822.1  | Q64680           |          |
| Gal $\beta$ -1,3/4-GlcNAc $\alpha$ -2,3-sialyltransferase ST3Gal II (fragment) | <i>Cricetulus griseus</i>     | n.d.     | AY266676 AAP22943.1   | Q80WK9           |          |
| $\alpha$ -2,3-sialyltransferase ST3Gal II (Siat5)                              | <i>Danio rerio</i>            | n.d.     | AJ783741 CAH04018.1   |                  |          |
| $\alpha$ -2,3-sialyltransferase ST3Gal IV (Siat4c)                             | <i>Danio rerio</i>            | n.d.     | AJ744809 CAG32845.1   |                  |          |

FIGURE 9B

FIGURE 10B

| Protein   | Organism                | EC#      | GenBank / GenPept  | SwissProt        | PDB / 3D |
|---|-------------------------|----------|--|------------------|----------|
| $\alpha$ -2,6-sialyltransferase<br>ST6Gal I (Siat1)                   | Danio rerio             | n.d.     | AJ744801 CAG32837.1  |                  |          |
| $\alpha$ -2,6-sialyltransferase<br>ST6GalNAc V (Siat7E)<br>(fragment) | Danio rerio             | n.d.     | AJ646874 CAG26703.1  |                  |          |
| $\alpha$ -2,8-sialyltransferase<br>ST8Sia I (Siat 8A)<br>(fragment)   | Danio rerio             | n.d.     | AJ715535 CAG29374.1  |                  |          |
| $\alpha$ -2,8-sialyltransferase<br>ST8Sia IV (Siat 8D)<br>(fragment)  | Danio rerio             | n.d.     | AJ715545 CAG29384.1  |                  |          |
| $\alpha$ -2,8-sialyltransferase<br>ST8Sia VI (Siat 8F)<br>(fragment)  | Danio rerio             | n.d.     | AJ715551 CAG29390.1  |                  |          |
| $\alpha$ -2,6-sialyltransferase<br>ST6Gal I (Siat1)                   | Danio rerio             | n.d.     | AJ627527 CAF29495.1  |                  |          |
| N-glycan $\alpha$ -2,8-sialyltransferase<br>(ST6Gal I)                | Danio rerio             | n.d.     | BC050483 AAH50483.1<br>AY055462 AAL17875.1<br>NM_153662 NP_705948.1  | Q7ZU51<br>Q8QH83 |          |
| ST3Gal-V  | Danio rerio             | n.d.     | AJ619960 CAF04061.1  |                  |          |
| $\alpha$ -2,6-sialyltransferase<br>(CG4871) ST6Gal I                  | Drosophila melanogaster | 2.4.99.1 | AE003465 AAF47256.1<br>AF218237 AAG13185.1<br>AF397532 AAK92126.1<br>AE003465 AAM70791.1<br>NM_079129 NP_523853.1<br>NM_166684 NP_726474.1 | Q9GU23<br>Q9W121 |          |
| $\alpha$ -2,3-sialyltransferase<br>ST3Gal I                           | Gallus gallus           | 2.4.99.4 | X80503 CAA56666.1<br>NM_205217 NP_990548.1   | Q11200           |          |
| $\alpha$ -2,3-sialyltransferase<br>(ST3GAL-II)                        | Gallus gallus           | n.d.     | AJ585761 CAE51385.2  |                  |          |
| $\alpha$ -2,6-sialyltransferase<br>ST6Gal I                           | Gallus gallus           | 2.4.99.1 | X75558 CAA53235.1<br>NM_205241 NP_990572.1   | Q92182           |          |
| $\alpha$ -2,6-sialyltransferase<br>ST6GalNAc II                       | Gallus gallus           | 2.4.99.- | X77775 AAE68030.1<br>NM_205233 CAA54813.1<br>NP_990564.1   | Q92184           |          |
| $\alpha$ -2,6-sialyltransferase<br>ST6GalNAc III (Siat7F)             | Gallus gallus           | n.d.     | AJ632455 CAG25677.1  |                  |          |

FIGURE 10C

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FIGURE ~~10~~ 10D

| Protein   | Organism            | EC#      | GenBank / GenPept   | SwissProt  | PDB / 3D |
|---|---------------------|----------|---|--|----------|
| $\alpha$ -2,3-sialyltransferase<br>ST3Gal IV                | <i>Homo sapiens</i> | 2.4.99.- | L23767 AAA16460.1<br>AF035249 AAC14162.1<br>BC010645 AAH10645.1<br>AY040826 AAK93790.1<br>AF516602 AAM66431.1<br>AF516603 AAM66432.1<br>AF516604 AAM66433.1<br>AF525084 AAM81378.1<br>X74570 CAA52662.1<br>CR456858 CAG33139.1<br>NM_006278 NP_006269.1 | Q11206<br>O60497<br>Q96QQ9<br>Q8N6A6<br>Q8N6A7<br>Q8NFD3<br>Q8NFG7 |          |
| $\alpha$ -2,6-sialyltransferase<br>(ST6Gal II ; KIAA1877)   | <i>Homo sapiens</i> | n.d.     | BC008680 AAH08680.1<br>AB058780 BAB47506.1<br>AB059555 BAC24793.1<br>AJ512141 CAD54408.1<br>AX795193 CAE48260.1<br>AX795193 CAE48261.1<br>NM_032528 NP_115917.1   | Q86Y44<br>Q8IUG7<br>Q96HE4<br>Q96JF0                               |          |
| $\alpha$ -2,6-sialyltransferase<br>(ST6Gal IVAC11P)         | <i>Homo sapiens</i> | n.d.     | BC008680 AAH08680.1<br>AB058780 BAB47506.1<br>AB059555 BAC24793.1<br>AJ512141 CAD54408.1<br>AX795193 CAE48260.1<br>AX795193 CAE48261.1<br>NM_032528 NP_115917.1   | Q8N289<br>Q8N6A6<br>Q8N6A7<br>Q8NFD3<br>Q8NFG7                     |          |
| $\alpha$ -2,6-sialyltransferase<br>(ST6GalNAc V)            | <i>Homo sapiens</i> | n.d.     | BC001201 AAH01201.1<br>AK056241 BAB71127.1<br>AL035409 CAB72344.1<br>AJ507292 CAD45372.1<br>NM_030965 NP_112227.1   | Q9BVH7   |          |
| $\alpha$ -2,6-sialyltransferase<br>(ST6GalNAc VI)           | <i>Homo sapiens</i> | 2.4.99.1 | BC001201 AAH01201.1<br>AK056241 BAB71127.1<br>AL035409 CAB72344.1<br>AJ507292 CAD45372.1<br>NM_030965 NP_112227.1   | Q8UJ11<br>Q8UJ12<br>Q8UJ13<br>Q8UJ14<br>NM_030965 NP_112227.1      |          |
| $\alpha$ -2,6-sialyltransferase<br>ST6Gal I                 | <i>Homo sapiens</i> | 2.4.99.1 | BC031476 AAH31476.1<br>BC040009 AAH40009.1<br>A17362 CAA01327.1<br>A23699 CAA01686.1<br>X17247 CAA35111.1<br>X54363 CAA38246.1<br>X62822 CAA44634.1<br>NM_003032 NP_003023.1<br>NM_173216 NP_775323.1   | P15907   |          |
| $\alpha$ -2,6-sialyltransferase<br>ST6GalNAc IV             | <i>Homo sapiens</i> | 2.4.99.1 | BC001201 AAH01201.1<br>AK056241 BAB71127.1<br>AL035409 CAB72344.1<br>AJ507292 CAD45372.1<br>NM_030965 NP_112227.1   | Q8UJ11<br>Q8UJ12<br>Q8UJ13<br>Q8UJ14<br>NM_030965 NP_112227.1      |          |
| $\alpha$ -2,8-polysialyltransferase<br>ST8Sia IV            | <i>Homo sapiens</i> | 2.4.99.- | L41680 AAC41775.1<br>BC027866 AAH27866.1<br>BC053657 AAH53657.1<br>NM_005668 NP_005659.1  | Q8N1F4<br>Q92187<br>Q92693   |          |
| $\alpha$ -2,8-sialyltransferase<br>(CD33 ; NTS1 ; ST8Sia I) | <i>Homo sapiens</i> | 2.4.99.1 | L41680 AAC41775.1<br>BC027866 AAH27866.1<br>BC053657 AAH53657.1<br>NM_005668 NP_005659.1  | Q86X71<br>Q92187<br>Q93064   |          |
| $\alpha$ -2,8-sialyltransferase                             | <i>Homo sapiens</i> | 2.4.99.- | L29556 AAA36613.1   | Q92186   |          |

FIGURE 10E

| Protein   | Organism                    | EC#      | GenBank / GenPept  | SwissProt  | PDB / 3D |
|---|-----------------------------|----------|--|--|----------|
| ST8Sia II   |                             |          | U82762 AAC51242.1<br>U33551 AAC24458.1<br>BC069584 AAH69584.1<br>NM_006011 NP_006002.1   | Q92470<br>Q92746   |          |
| $\alpha$ -2,8-sialyltransferase<br>ST8Sia V                                     | <i>Homo sapiens</i>         | 2.4.99.- | U91641 AAC51727.1<br>CR457037 CAG33318.1<br>NM_013305 NP_037437.1  | O15466   |          |
| lactosylceramide $\alpha$ -2,3-<br>sialyltransferase (ST3Gal<br>V)              | <i>Homo sapiens</i>         | 2.4.99.9 | AF105026 AAD14634.1<br>AF119415 AAF66146.1<br>BC065936 AAH65936.1<br>AY152815 AAO16866.1<br>AAP65066 AAP65066.1<br>AY359105 AAQ89463.1<br>AB018356 BAA33950.1<br>AX876536 CAE89320.1<br>NM_003896 NP_003887.2  | Q9UNP4<br>O94902   |          |
| N-acetylgalactosaminide<br>$\alpha$ -2,6-sialyltransferase IV<br>(ST8GalNAc IV) | <i>Homo sapiens</i>         | 2.4.99.- | AF127142 AAF00102.1<br>BC036705 AAH36705.1<br>-AAP63349.1<br>AB035172 BAA87034.1<br>AK000600 BAA91281.1<br>Y17461 CAB44354.1<br>AJ271734 CAC07404.1<br>AX061620 CAC24981.1<br>AX068265 CAC27250.1<br>AX969252 CAF14380.1<br>NM_014403 NP_055218.3<br>NM_175039 NP_778204.1 | Q9H4F1<br>Q9NWU6<br>Q9UKU1<br>Q9ULB9<br>Q9Y3G3<br>Q9Y3G4 |          |
| unnamed protein product   | <i>Homo sapiens</i>         | n.d.     | AK021929 BAB13940.1<br>AX881696 CAE91353.1   | Q9HAA9   |          |
| GalNAc-4-epimerase<br>2,3-sialyltransferase                                     | <i>Mesocricetus auratus</i> | 2.4.99.6 | AU213699 CAB54997.1<br>AF090498 AAF09049.1   | Q9GXP8   |          |

FIGURE 10F

| Protein   | Organism                    | EC#      | GenBank / GenPept  | SwissProt                                      | PDB / 3D |
|---|-----------------------------|----------|--|--|----------|
| Gal $\beta$ -1,3/4-GlcNAc $\alpha$ -2,3-sialyltransferase (ST3Gal IV) | <i>Mesocricetus auratus</i> | 2.4.99.6 | AJ245700 CAB53395.1  | Q9QXF5   |          |
| polysialyltransferase (ST8Sia IV)                                     | <i>Mesocricetus auratus</i> | 2.4.99.- | AJ245701 CAB53396.1  | Q9QXF4   |          |
| $\alpha$ -2,3-sialyltransferase ST3Gal II                             | <i>Mus musculus</i>         | 2.4.99.4 | BC015264 AAH15264.1<br>BC068064 AAH66064.1<br>AK034554 BAC28752.1<br>AK034863 BAC28859.1<br>AK053827 BAC35543.1<br>X76989 CAA54294.1<br>NM_009179 NP_033205.1<br>NM_178048 NP_835149.1 | Q11204<br>Q8BPL0<br>Q8BSA0<br>Q8BSE9<br>Q91WH6 |          |
| $\alpha$ -2,3-sialyltransferase ST3Gal III                            | <i>Mus musculus</i>         | 2.4.99.4 | BC008710 AAH106910.1<br>AK004050 BAB23779.1<br>AK041916 BAB21699.1<br>X61234 CAA59013.1<br>NM_009176 NP_033202.1   | P97305<br>Q912X9<br>Q907Z9<br>Q9D7B6           |          |
| $\alpha$ -2,3-sialyltransferase ST3Gal IV                             | <i>Mus musculus</i>         | 2.4.99.4 | BC011121 AAH11121.1<br>BC050773 AAH50773.1<br>D28941 BAA08068.1<br>AK008543 BAB25732.1<br>AB061305 BAB47508.1<br>X95809 CAA65076.1<br>NM_009178 NP_033204.2                            | P97354<br>Q81325<br>Q91Y74<br>Q921R5<br>Q9CVE8 |          |
| $\alpha$ -2,6-sialyltransferase ST6GalNAc II                          | <i>Mus musculus</i>         | 2.4.99.2 | BC019890 AAH19890.1<br>BC054385 AAH52338.1<br>AB053526 BAB7999.1<br>AK033562 BAC32160.1<br>AK011170 BAB29020.1<br>NM_018784 NP_061254.1  | P08080<br>Q8B1Y1<br>Q81MB0<br>Q9WV02<br>Q91112 |          |
| $\alpha$ -2,6-sialyltransferase ST6Gal II                             | <i>Mus musculus</i>         | 2.4.99.2 | BC018789 AAH18789.1<br>BC027889 AAH27889.1<br>AB010655 BAB06605.1<br>AK034766 BAC28828.1<br>AK031124 BAC38120.1<br>NM_145983 NP_066045.1   | Q64685<br>Q8B1B2<br>Q8K112<br>Q9WU22<br>Q91112 |          |
| $\alpha$ -2,6-sialyltransferase ST6Gal II                             | <i>Mus musculus</i>         | n.d.     | AK082586 BAC38534.1<br>AB095093 BAC87752.1<br>AK129482 BAC98272.1<br>NM_172829 NP_766417.1   | Q8BUU4   |          |
| $\alpha$ -2,6-sialyltransferase ST6GalNAc III                         | <i>Mus musculus</i>         | n.d.     | BC058387 AAH58387.1<br>AK034804 BAC28836.1<br>Y11342 CAA72181.2<br>Y11343 CAB95031.1<br>NM_011372 NP_035502  | Q9WUV2<br>Q9JHP5                               |          |
| $\alpha$ -2,6-sialyltransferase ST6GalNAc IV                          | <i>Mus musculus</i>         | 2.4.99.7 | BC056456 AAH56456.1<br>AK085730 BAC39623.1<br>AK003100 CAA07746.1<br>X71679 CAA54697.1   | Q8C392<br>Q9JHP2<br>Q9R2B6<br>Q8B723           |          |



FIGURE 56 106

| Protein   | Organism            | EC#      | GenBank / GenPept  | SwissProt  | PDB / 3D |
|---|---------------------|----------|--|--|----------|
| $\alpha$ -2,8-sialyltransferase (GD3 synthase) ST8Sia I | <i>Mus musculus</i> | 2.4.99.8 | L38677 AAA91869.1<br>BC024821 AAH24821.1<br>AK048188 BAC32625.1<br>AK052444 BAC34994.1<br>X84235 CAA59014.1<br>AJ401102 CAC20706.1<br>NM_011374 NP_035504.1                          | Q64468<br>Q64687<br>Q8BL76<br>Q8BW10<br>Q8K1C1<br>Q9EPK0 | 1G9H     |
| $\alpha$ -2,8-sialyltransferase ST8Sia II               | <i>Mus musculus</i> | 2.4.99.- | X83562 CAA58548.1<br>X99646 CAA67965.1<br>X99847 CAA67965.1<br>X99848 CAA67965.1<br>X99649 CAA67965.1<br>X99650 CAA67965.1<br>X99651 CAA67965.1<br>NM_009181 NP_033207.1             | O35696   | 1G9H     |
| $\alpha$ -2,8-sialyltransferase ST8Sia V                | <i>Mus musculus</i> | 2.4.99.- | BC034855 AAH34855.1<br>AK078870 BAC37354.1<br>X98014 CAA66642.1<br>X98014 CAA66643.1<br>X98014 CAA66644.1<br>NM_013666 NP_038694.1<br>NM_153124 NP_094764.1<br>NM_177416 NP_803135.1 | P70126<br>P70127<br>P70128<br>Q8BJW0<br>Q8JZQ3           | 1G9H     |
| $\alpha$ -2,8-sialyltransferase ST8Sia III              | <i>Mus musculus</i> | 2.4.99.- | BC034855 AAH34855.1<br>AK078870 BAC37354.1<br>X98014 CAA66642.1<br>X98014 CAA66643.1<br>X98014 CAA66644.1<br>NM_013666 NP_038694.1<br>NM_153124 NP_094764.1<br>NM_177416 NP_803135.1 | P70126<br>P70127<br>P70128<br>Q8BJW0<br>Q8JZQ3           | 1G9H     |
| GD1 synthase (ST6GalNAc V)                              | <i>Mus musculus</i> | n.d.     | BC055737 AAH55737.1<br>AB030836 BAA85747.1<br>AB028840 BAA89292.1<br>AK034387 BAC28693.1<br>AK038434 BAC29997.1<br>AK042683 BAC31331.1<br>NM_012028 NP_036158.2                      | Q8CAM7<br>Q8CBX1<br>Q9QYJ1<br>Q9R0K6                     | 1G9H     |
| $\alpha$ -2,6-sialyltransferase ST6GalNAc I             | <i>Mus musculus</i> | 2.4.99.6 | BC036985 AAH36985.1<br>AB035174 BAA87036.1<br>AB035123 BAA95940.1<br>AK030648 BAC27064.1<br>NM_016973 NP_058669.1  | Q8CDC3<br>Q8JZW3<br>Q9JM95<br>Q9R0G9                     | 1G9H     |
| $\alpha$ -2,3-sialyltransferase                         | <i>Oncorhynchus</i> | n.d.     | AJ585760 CAE51384.1  |  | 1G9H     |



FIGURE 10

| Protein  | Organism                                      | EC#      | GenBank / GenPept                          | SwissProt | PDB |
|--|---|----------|--|-----------|-----|
| (ST3Gal-I)   | <i>mykiss</i>                                 |          |  |           |     |
| $\alpha$ -2,8-polysialyltransferase IV (ST8Sia IV)                           | <i>Oncorhynchus mykiss</i>                    | n.d.     | AB094402 BAC77411.1                        | Q7T2X5    |     |
| $\alpha$ -2,3-sialyltransferase ST3Gal IV                                    | <i>Oryctolagus cuniculus</i>                  | 2.4.99.- | AF121967 AAF28871.1                        | Q9N257    |     |
| $\alpha$ -2,3-sialyltransferase ST3Gal IV                                    | <i>Oryza sativa (japonica cultivar-group)</i> | n.d.     | AL731626 CAD41185.1<br>AL662969 CAE04714.1 |           |     |
| $\alpha$ -2,6-sialyltransferase ST6GalNAc V (Siat7E) (fragment)              | <i>Oryzias latipes</i>                        | n.d.     | AJ646876 CAG26705.1                        |           |     |
| $\alpha$ -2,3-sialyltransferase ST3Gal II (Siat5)                            | <i>Pan troglodytes</i>                        | n.d.     | AJ744804 CAG32840.1                        |           |     |
| $\alpha$ -2,3-sialyltransferase ST3Gal IV (Siat4c)                           | <i>Pan troglodytes</i>                        | n.d.     | AJ626824 CAF25182.1                        |           |     |
| $\alpha$ -2,6-sialyltransferase (Siat7A)                                     | <i>Pan troglodytes</i>                        | n.d.     | AJ748740 CAG38615.1                        |           |     |
| $\alpha$ -2,6-sialyltransferase ST6GalNAc III (Siat7C)                       | <i>Pan troglodytes</i>                        | n.d.     | AJ634454 CAG25676.1                        |           |     |
| $\alpha$ -2,6-sialyltransferase ST6GalNAc IV (Siat7D) (fragment)             | <i>Pan troglodytes</i>                        | n.d.     | AJ646875 CAG26704.1                        |           |     |
| $\alpha$ -2,8-sialyltransferase 8A (Siat8A)                                  | <i>Pan troglodytes</i>                        | 2.4.99.8 | AJ697658 CAG26896.1                        |           |     |
| $\alpha$ -2,8-sialyltransferase 8C (Siat8C)                                  | <i>Pan troglodytes</i>                        | n.d.     | AJ697660 CAG26898.1                        |           |     |
| $\alpha$ -2,8-sialyltransferase 8E (Siat8E)                                  | <i>Pan troglodytes</i>                        | n.d.     | AJ697662 CAG26900.1                        |           |     |
| $\beta$ -galactosamide $\alpha$ -2,6-sialyltransferase I (ST6Gal I; Siat1)   | <i>Pan troglodytes</i>                        | 2.4.99.1 | AJ627624 CAF29492.1                        |           |     |
| $\beta$ -galactosamide $\alpha$ -2,6-sialyltransferase II (ST6Gal II; Siat2) | <i>Pan troglodytes</i>                        | n.d.     | AJ627625 CAF29493.1                        |           |     |
| GM3 synthase ST3Gal V  | <i>Pan troglodytes</i>                        | n.d.     | AJ744807 CAG32843.1                        |           |     |

FIGURE 9 10 E

| Protein  | Organism                             | EC#      | GenBank / GenPept                            | SwissProt        | PDB / 3D |
|--|--------------------------------------|----------|--|------------------|----------|
| (Siat9)  |                                      |          |  |                  |          |
| $\alpha$ -2,3-sialyltransferase<br>ST3Gal III                          | <i>Rattus norvegicus</i>             | 2.4.99.6 | M97754 AAA42146.1<br>NM 031687 NP 113885.1   | Q02734           |          |
| $\alpha$ -2,3-sialyltransferase<br>ST3Gal IV (Siat9)                   | <i>Rattus norvegicus</i>             | n.d.     | AJ626823 CAG25180.1                          |                  |          |
| $\alpha$ -2,3-sialyltransferase<br>ST3Gal VI                           | <i>Rattus norvegicus</i>             | n.d.     | AJ626743 CAG25053.1                          |                  |          |
| $\alpha$ -2,6-sialyltransferase<br>ST6Gal I                            | <i>Rattus norvegicus</i>             | 2.4.99.1 | M18769 AAA41196.1<br>M83143 AAB07233.1       | P13721           |          |
| $\alpha$ -2,6-sialyltransferase<br>ST6GalNAc II (Siat7B)               | <i>Rattus norvegicus</i>             | n.d.     | AJ634457 CAG25679.1                          |                  |          |
| $\alpha$ -2,6-sialyltransferase<br>ST6GalNAc IV (Siat7D)<br>(fragment) | <i>Rattus norvegicus</i>             | n.d.     | AJ646871 CAG26700.1                          |                  |          |
| $\alpha$ -2,6-sialyltransferase<br>ST6GalNAc VI (Siat7F)<br>(fragment) | <i>Rattus norvegicus</i>             | n.d.     | AJ646881 CAG26710.1                          |                  |          |
| $\alpha$ -2,8-sialyltransferase<br>(Siat8E)                            | <i>Rattus norvegicus</i>             | n.d.     | AJ699422 CAG27884.1                          |                  |          |
| $\alpha$ -2,8-sialyltransferase<br>ST8Sia II                           | <i>Rattus norvegicus</i>             | 2.4.99.- | L13445 AAA42147.1<br>NM 057156 NP 476497.1   | Q07977<br>Q64688 |          |
| $\alpha$ -2,8-sialyltransferase<br>ST8Sia IV                           | <i>Rattus norvegicus</i>             | 2.4.99.- | U90215 AAB49989.1                            | O08563           |          |
| GM3 synthase ST3Gal V  | <i>Rattus norvegicus</i>             | n.d.     | AB018049 BAA33492.1<br>NM 031337 NP 112627.1 | O88830           |          |
| $\alpha$ -2,3-sialyltransferase<br>(Siat3A)                            | <i>Silurana tropicalis</i>           | n.d.     | AJ585763 CAE51387.1                          |                  |          |
| $\alpha$ -2,6-sialyltransferase<br>(Siat6A)                            | <i>Strongylocentrotus purpuratus</i> | n.d.     | AJ699425 CAG27887.1                          |                  |          |
| $\alpha$ -2,3-sialyltransferase<br>(ST3Gal-IV)                         | <i>Sus scrofa</i>                    | n.d.     | AJ584674 CAE48299.1                          |                  |          |
| $\alpha$ -2,6-sialyltransferase<br>(fragment) ST6Gal I                 | <i>Sus scrofa</i>                    | 2.4.99.1 | AF136746 AAD33059.1                          | Q9XSG8           |          |
| $\alpha$ -2,6-sialyltransferase<br>(fragment) ST6Gal I                 | <i>Sus scrofa</i>                    | n.d.     | AJ620948 CAG06585.1                          |                  |          |
| $\alpha$ -2,6-sialyltransferase<br>(fragment) ST6Gal I                 | <i>Sus scrofa</i>                    | n.d.     | AF041031 AAC15633.1                          | O62717           |          |

FIGURE 3 10J

| Protein  | Organism                      | EC#      | GenBank / GenPept                        | SwissProt | PDB / 3D |
|--|-------------------------------|----------|--|-----------|----------|
| $\alpha$ -2,3-sialyltransferase (Siat5-r)                                  | <i>Takifugu rubripes</i>      | n.d.     | AJ744805 CAG32841.1                      |           |          |
| $\alpha$ -2,3-sialyltransferase (Siat5)                                    | <i>Takifugu rubripes</i>      | n.d.     | AJ626816 CAF25175.1                      |           |          |
| $\alpha$ -2,3-sialyltransferase ST3Gal II (Siat5) (fragment)               | <i>Takifugu rubripes</i>      | n.d.     | AJ626817 CAF25175.1                      |           |          |
| $\alpha$ -2,3-sialyltransferase ST3Gal III (Siat6)                         | <i>Takifugu rubripes</i>      | n.d.     | AJ626818 CAF25176.1                      |           |          |
| $\alpha$ -2,6-sialyltransferase ST6Gal I (Siat1)                           | <i>Takifugu rubripes</i>      | n.d.     | AJ744800 CAG32836.1                      |           |          |
| $\alpha$ -2,6-sialyltransferase ST6GalNAc II (Siat7B)                      | <i>Takifugu rubripes</i>      | n.d.     | AJ664460 CAG25682.1                      |           |          |
| $\alpha$ -2,6-sialyltransferase ST6GalNAc II B (Siat7B-related) (fragment) | <i>Takifugu rubripes</i>      | n.d.     | AJ664461 CAG25682.1                      |           |          |
| $\alpha$ -2,6-sialyltransferase ST6GalNAc III (Siat7C) (fragment)          | <i>Takifugu rubripes</i>      | n.d.     | AJ664462 CAG25683.1                      |           |          |
| $\alpha$ -2,6-sialyltransferase ST6GalNAc IV (Siat7D) (fragment)           | <i>Takifugu rubripes</i>      | 2.4.99.3 | Y17466 CAB44338.1<br>AJ646869 CAG26698.1 | Q9W6U6    |          |
| $\alpha$ -2,6-sialyltransferase ST6GalNAc V (Siat7E) (fragment)            | <i>Takifugu rubripes</i>      | n.d.     | AJ646870 CAG26699.1                      |           |          |
| $\alpha$ -2,6-sialyltransferase ST6GalNAc VI (Siat7F) (fragment)           | <i>Takifugu rubripes</i>      | n.d.     | AJ646880 CAG26709.1                      |           |          |
| $\alpha$ -2,8-sialyltransferase ST8Sia I (Siat8A) (fragment)               | <i>Takifugu rubripes</i>      | n.d.     | AJ715531 CAG29373.1                      |           |          |
| $\alpha$ -2,8-sialyltransferase ST8Sia II (Siat 8B) (fragment)             | <i>Takifugu rubripes</i>      | n.d.     | AJ715538 CAG29377.1                      |           |          |
| $\alpha$ -2,8-sialyltransferase ST8Sia III (Siat 8C) (fragment)            | <i>Takifugu rubripes</i>      | n.d.     | AJ715539 CAG29380.1                      |           |          |
| $\alpha$ -2,8-sialyltransferase ST8Sia IIIr (Siat 8Cr) (fragment)          | <i>Takifugu rubripes</i>      | n.d.     | AJ715542 CAG29381.1                      |           |          |
| $\alpha$ -2,8-sialyltransferase ST8Sia IV (Siat 8D) (fragment)             | <i>Takifugu rubripes</i>      | n.d.     | AJ715543 CAG29382.1                      |           |          |
| $\alpha$ -2,8-sialyltransferase ST8Sia VI (Siat 8F) (fragment)             | <i>Takifugu rubripes</i>      | n.d.     | AJ715549 CAG29388.1                      |           |          |
| $\alpha$ -2,8-sialyltransferase ST8Sia VII (Siat 8G) (fragment)            | <i>Takifugu rubripes</i>      | n.d.     | AJ715550 CAG29389.1                      |           |          |
| $\alpha$ -2,3-sialyltransferase (Siat5-r)                                  | <i>Tetraodon nigroviridis</i> | n.d.     | AJ744806 CAG32842.1                      |           |          |
| $\alpha$ -2,3-sialyltransferase ST3Gal I (Siat5)                           | <i>Tetraodon nigroviridis</i> | n.d.     | AJ744807 CAG32843.1                      |           |          |
| $\alpha$ -2,3-sialyltransferase ST3Gal III (Siat6)                         | <i>Tetraodon nigroviridis</i> | n.d.     | AJ626822 CAF25180.1                      |           |          |
| $\alpha$ -2,6-sialyltransferase ST6GalNAc II (Siat7B)                      | <i>Tetraodon nigroviridis</i> | n.d.     | AJ684461 CAG25683.1                      |           |          |
| $\alpha$ -2,6-sialyltransferase ST6GalNAc V (Siat7E) (fragment)            | <i>Tetraodon nigroviridis</i> | n.d.     | AJ646879 CAG26708.1                      |           |          |
| $\alpha$ -2,8-sialyltransferase ST8Sia I (Siat8A) (fragment)               | <i>Tetraodon nigroviridis</i> | n.d.     | AJ715536 CAG29375.1                      |           |          |
| $\alpha$ -2,8-sialyltransferase ST8Sia II (Siat 8B) (fragment)             | <i>Tetraodon nigroviridis</i> | n.d.     | AJ715537 CAG29376.1                      |           |          |
| $\alpha$ -2,8-sialyltransferase ST8Sia III (Siat 8C) (fragment)            | <i>Tetraodon nigroviridis</i> | n.d.     | AJ715539 CAG29378.1                      |           |          |



FIGURE 9A 10K

| Protein  | Organism                                | EC#     | GenBank / GenPept   | SwissProt | PDB / 3D |
|--|---|---------|---|-----------|----------|
| $\alpha$ -2,8-sialyltransferase<br>ST8Sia IIIr (Siat 8Cr)<br>(fragment)      | <i>Tetraodon<br/>nigrovittatus</i>      | n.d.    | AJ715540 CAG29379.1   |           |          |
| $\alpha$ -2,8-sialyltransferase<br>(fragment)                                | <i>Tetraodon<br/>nigrovittatus</i>      | n.d.    | AJ715540 CAG29379.1   |           |          |
| $\alpha$ -2,3-sialyltransferase<br>(St3Gal-II)                               | <i>Xenopus laevis</i>                   | n.d.    | AJ585762 CAE51386.1   |           |          |
| $\alpha$ -2,3-sialyltransferase<br>(St3Gal-III)                              | <i>Xenopus laevis</i>                   | n.d.    | AJ585764 CAE51388.1<br>AJ626823 CAF25181.1                        |           |          |
| $\alpha$ -2,8-sialyltransferase<br>ST8Sia-I (Siat8A;GD3<br>synthase)         | <i>Xenopus laevis</i>                   | n.d.    | AY272056 AAQ18162.1<br>AY272057 AAQ18163.1<br>AJ704562 CAG28695.1 |           |          |
| $\alpha$ -2,3-sialyltransferase<br>(3Gal-VI)                                 | <i>Xenopus tropicalis</i>               | n.d.    | AJ626744 CAF25054.1   |           |          |
| $\alpha$ -2,6-sialyltransferase<br>(Siat6)                                   | <i>Xenopus tropicalis</i>               | n.d.    | AJ646878 CAG26707.1   |           |          |
| $\alpha$ -2,6-sialyltransferase<br>ST6GalNAc V (Siat7E)<br>(fragment)        | <i>Xenopus tropicalis</i>               | n.d.    | AJ646878 CAG26707.1   |           |          |
| $\beta$ -galactosamide $\alpha$ -2,6-<br>sialyltransferase II<br>(ST6Gal II) | <i>Xenopus tropicalis</i>               | n.d.    | AJ627628 CAF29496.1   |           |          |
| $\alpha$ -2,3-sialyltransferase<br>(Siat3)                                   | <i>Xenopus tropicalis</i>               | n.d.    | AJ627628 CAF29496.1   |           |          |
| polysialyltransferase  | <i>Escherichia coli K92</i>             | 2.4.-.- | M88479 AAA24215.1 Q47404  |           |          |
| SynE   | <i>Neisseria meningitidis<br/>FAM18</i> | n.d.    | U75650 AAB53842.1 O06435  |           |          |
| SiaD (fragment)  | <i>Neisseria meningitidis<br/>M209</i>  | n.d.    | AY281046 AAP34769.1   |           |          |
| polysialyltransferase (SiaD)(fragment)                                       | <i>Neisseria meningitidis<br/>M3315</i> | n.d.    | AY234191 AAO85289.1   |           |          |
| polysialyltransferase (SiaD)(fragment)                                       | <i>Neisseria meningitidis<br/>M4211</i> | n.d.    | AY234190 AAO85288.1   |           |          |
| polysialyltransferase (SiaD)(fragment)                                       | <i>Neisseria meningitidis<br/>M5177</i> | n.d.    | AY234193 AAO85291.1   |           |          |
| SiaD (fragment)  | <i>Neisseria meningitidis<br/>M980</i>  | n.d.    | AY281045 AAP34768.1   |           |          |
| SiaD (fragment)  | <i>Neisseria meningitidis<br/>M980</i>  | n.d.    | AY281045 AAP34768.1   |           |          |

FIGURE 4 10 L

| Protein                         | Organism                                      | EC#      | GenBank / GenPept                            | SwissProt PDB / 3D |
|---------------------------------|---|----------|--|--------------------|
| ORF2                            | <i>Haemophilus influenzae A2</i>              | n.d.     | M94855 AAA24979.1                            |                    |
| $\alpha$ -2,3-sialyltransferase | <i>Neisseria gonorrhoeae F62</i>              | 2.4.99.4 | U60664 AAC44539.1<br>AAE67205.1              | P72074             |
| $\alpha$ -2,3-sialyltransferase | <i>Neisseria meningitidis 406Y, NRCC 4030</i> | 2.4.99.4 | U60661 AAC44543.1                            |                    |
| NMA1118                         | <i>Neisseria meningitidis Z2491</i>           | n.d.     | AL162755 CAB84380.1<br>NC_003116 NP_283887.1 | Q9JUV5             |
| WaaH                            | <i>Salmonella enterica SARB25</i>             | n.d.     | AF519787 AAM82550.1                          | Q8KS93             |
| WaaH                            | <i>Salmonella enterica SARB39</i>             | n.d.     | AF519789 AAM82552.1                          |                    |
| WaaH                            | <i>Salmonella enterica SARB57</i>             | n.d.     | AF519791 AAM82554.1                          | Q8KS91             |
| WaaH                            | <i>Salmonella enterica SARB8</i>              | n.d.     | AF519792 AAM82555.1                          | Q8KS90             |
| WaaH (fragment)                 | <i>Salmonella enterica SARC12</i>             | n.d.     | AF519781 AAM88842.1                          |                    |
| WaaH (fragment)                 | <i>Salmonella enterica SARC14I</i>            | n.d.     | AF519783 AAM88844.1                          | Q8KS97             |
| WaaH                            | <i>Salmonella enterica SARC16II</i>           | n.d.     | AF519785 AAM88846.1                          | Q8KS95             |

FIGURE 10M

| Protein  | Organism                                | EC#      | GenBank / GenPept                                 | SwissProt      | PDB / 3D |
|--|---|----------|---|----------------|----------|
| WaaH (fragment)  | <i>Salmonella enterica</i> SARC4I       | n.d.     | AF519773 AAM88835.1                               | Q8KSA3         |          |
| WaaH   | <i>Salmonella enterica</i> SARC6IIa     | n.d.     | AF519775 AAM88837.1                               | Q8KSA2         |          |
| WaaH   | <i>Salmonella enterica</i> SARC9V       | n.d.     | AF519778 AAM88839.1                               | Q8KSA0         |          |
| Cst  | <i>Campylobacter jejuni</i> 81-176      | n.d.     | AF305571 AAL09368.1                               |                |          |
| $\alpha$ -2,3-sialyltransferase (Cst-III)                  | <i>Campylobacter jejuni</i> ATCC 43430  | 2.4.99.- | AF400047 AAK85419.1                               |                |          |
| $\alpha$ -2,3/8-sialyltransferase (CstII)                  | <i>Campylobacter jejuni</i> ATCC 43438  | n.d.     | AF400048 AAK91725.1                               | Q93MQ0         |          |
| $\alpha$ -2,3-sialyltransferase (Cst-II)                   | <i>Campylobacter jejuni</i> ATCC 43456  | 2.4.99.- | AF401528 AAL05990.1                               | Q93D05         |          |
| $\alpha$ -2,3/8-sialyltransferase (Cst-II)                 | <i>Campylobacter jejuni</i> ATCC 700297 | n.d.     | AF216647 AAL36462.1                               |                |          |
| $\alpha$ -2,3-sialyltransferase cstIII                     | <i>Campylobacter jejuni</i> MSC57360    | 2.4.99.- | AF195055 AAG29922.1                               |                |          |
| $\alpha$ -2,3/8-sialyltransferase II (cstII)               | <i>Campylobacter jejuni</i> O:10        | n.d.     | -AAO98669.1<br>AX934427 CAF04167.1                |                |          |
| $\alpha$ -2,3/8-sialyltransferase II (CstII)               | <i>Campylobacter jejuni</i> O:36        | n.d.     | AX934436 CAF04171.1                               |                |          |
| $\alpha$ -2,3/8-sialyltransferase II (CstII)               | <i>Campylobacter jejuni</i> O:41        | n.d.     | -AAO98670.1<br>-AAT17967.1<br>AX934429 CAF04168.1 |                |          |
| bifunctional $\alpha$ -2,3/-2,8-sialyltransferase (Cst-II) | <i>Campylobacter jejuni</i> OH4384      | 2.4.99.- | AF130984 AAF31771.1<br>AX934425 CAF04166.1        | 1RO7C<br>1RO8A |          |



## FIGURE 5

ION

| Protein                                       | Organism                     | EC#  | GenBank / GenPept     | SwissProt | PDB / 3D |
|---|------------------------------|------|-----------------------|-----------|----------|
| PM1174  | <i>Pasteurella multocida</i> | n.d. | AE008167 AAK03258.1   | Q9CLP3    |          |
| PM70  |                              |      | NC_002683 NP_248111.1 |           |          |
| Sequence 10 from patent US 6699705            | Unknown.                     | n.d. | -AAT17969.1           |           |          |
| Sequence 2 from patent US 6709834             | Unknown.                     | n.d. | -AAT23232.1           |           |          |
| Sequence 3 from patent US 6699705             | Unknown.                     | n.d. | -AAT17965.1           |           |          |
| Sequence 35 from patent US 6503744 (fragment) | Unknown.                     | n.d. | -AAO96685.1           |           |          |
| Sequence 48 from patent US 6699705            | Unknown.                     | n.d. | -AAT17988.1           |           |          |
| Sequence 5 from patent US 6699705             | Unknown.                     | n.d. | -AAT17966.1           |           |          |
| Sequence 19 from patent US 6503744 (fragment) | Unknown.                     | n.d. | -AAO96671.1           |           |          |